

XIII. *Erebia lefebvrei* and *Lycæna pyrenaica*. By T. A. CHAPMAN, M.D., F.Z.S.

[Read March 4th, 1908.]

PLATES VIII—XIII.

IN spite of demonstration to the contrary, we find these two species sunk as varieties in Staudinger's 1901 Catalogue.

After making full allowance for Staudinger's prejudice against allowing any French form to be a good species, as seen in several other instances besides these, his unquestionable eminence makes it necessary to prove by every available means that these species are not mere varieties.

As regards *lefebvrei* I demonstrated abundantly in our Transactions, 1898, p. 225, by the structure of the ♂ ancillary appendages, that *lefebvrei* and *melas* were distinct species.

Unfortunately such characters do not appeal to a very large proportion of entomologists, chiefly because they know nothing about them. In consequence, they entirely misinterpret such facts as Dr. K. Jordan especially has illustrated, viz. that these appendages are as variable as any other characters, and often differ in a regular way in different races of the same species. From such circumstances they hasten to the conclusion that these structures give no certain indication of specific differences, and in short, which doubtless they find very comforting, that what they don't know is not worth knowing. Yet, because these structures present such variations, to assume that their indications are untrustworthy, is of about the same order of logic, as to assume that *Colias edusa* and *Colias hyale* are one species, because *C. edusa* var. *helice* is of much the same colour as *C. hyale*.

It happens further that though I fell into no error as to the relations of *lefebvrei* to *melas*, nor indeed as to those of *melas* to *nerine*, I made the serious error of assuming that *nerine* and not *melas* was the prior name. This error as to nomenclature, no doubt discounted the value of my

evidence as to structural details, in the eyes of those to whom correctness of nomenclature is everything. Not that I am a heretic as to the value of correct nomenclature, and I am certainly strongly opposed to those who err therein wilfully, but I do plead that in studying structure, it is a grievous drawback to have to spend time in nomenclatorial research.

In visiting the Pyrenees last (1907) summer, one of my objects was to study on the spot these two species, and with regard to *E. lefebvrei* to determine some points, quite apart from the structure of the appendages, that would appeal to the ordinary systematist as proving it to be a species distinct from *E. melas*.

I obtained a very fair series of *E. lefebvrei* at Gavarnie, and had the pleasure of exhibiting them to the Society (Feb. 5, 1908). Of *E. melas*, I have a fair series from various sources, chiefly from Staudinger and from Mr. A. H. Jones.

At Gavarnie *E. lefebvrei* occurs apparently in all suitable localities. These are always more or less steep stony slopes, so that it is not altogether erroneous to compare its habits in this respect with those of *E. glacialis*. The range of *E. glacialis* is, however, some 1,000 feet higher than that of *E. lefebvrei*, and its habitats are even more stony and bare than those of the latter. Both, however, occur amongst rough stones where it is practically impossible to follow them and where it seems a problem where the larvæ can find food. Both, if driven off into grassy ground, work back at once to the stony slopes. But both may also be met with on steep slaty screes, on which locomotion is fairly practicable. The lowest level at which I met with the insect at Gavarnie was on the floor of the Cirque, at about 5,500 feet. I met with it in various other directions, but it was most abundant and most easily captured on the ridge between the two paths to the Port d'Espagne, but more especially on its north slope looking down into the Val de Holle, at about 7,500 feet. It was also seen freely at the Port d'Espagne itself, rather on the Spanish side, on tolerably level ground (for *lefebvrei*). The females are much less numerous than the males, not probably actually, but from the collector's point of view, and like those of *glacialis*, not unfrequently occur, singly or paired, towards the grassy lower margin of the bare slopes where the males disport themselves.

*E. melas*, from all I can learn about it, much more resembles *nerine* in its habitats than it does *lefebvrei*. It is found (even in the South and East of Europe) below 4,000 feet, and does not go much above that elevation. At Herculesbad it occurs on the slopes of the Domogled, which is only some 3,600 feet high. This is like *nerine*, which occurs when I have taken it at Cortina and on the way up to the Mendel Pass a good way below and not much above 4,000 feet. Its habitat at Mendel is below that of *E. curyale*, a by no means high level form.

In regard to the structure of the clasps all three belong to the group that contains *pronoe*, and may be called the *pronoe* group, *pronoe* being the most abundant and widely distributed, possibly but not necessarily, the most ancestral of the group. *Scipio* is the other member of the central portion of the group. *Neoridas* and *zapateri* are also very close if not actually within the group. Others are less close. The clasp in this group is characterised by a robust body and a long and comparatively slender neck. There is a dorsal prominence where the body joins the neck, and this usually carries some spines. They are absent in *scipio* and very often in *nerine*.

*Lefebvrei* has these spines at the angle well-pronounced, and has others more basal on the body.

*Nerine* and *melas* are identical, usually there is one spine at the junction of the body and neck, in *nerine* sometimes none; I have a specimen of each species with three spines here. In neither of them do any spines occur back on the body, but not unfrequently there is an odd spine or two on the neck, usually looking as if it were one of the terminal spines retreated on to the neck, sometimes it is nearer the base. In *lefebvrei* the terminal spines are a group confined to the end of the clasps, in *nerine* and *melas* they are often very much the same, but also often spread round and tending to invade the neck. I have not seen this in *lefebvrei*.

One result of these differences is a marked contrast between the clasps of *lefebvrei* and *melas* (with *nerine*) when seen in profile at the proper angle.

*Lefebvrei* appears to have the body of the same or nearly the same thickness to the angle, and then with a rapid sweep, often incurved, the margin descends to the comparatively slender neck. In *melas* the body gradually narrows to the angle and proceeds onwards in the neck

with no very marked transition, even when a spine or two is present on the angle.

When we come to the ordinary imaginal characters, we find *nerine* has the usual *Erebica* markings on both surfaces, whereas *lefebvrei* and *melas* are very wanting in the red-brown of the upper surface and the ♂♂ have usually the hind-wings beneath pure black, with no very decided markings, except the ocelli. This, in fact, is the ground, and the only one that I know of for uniting *melas* and *lefebvrei*. Yet this is a feature in which a great many species vary so much. As every one knows, a form of *glacialis* was for some time called *melas*, var. *nicholli*, and really it was extremely difficult to say in what it differed from *melas*; it took this form in its well-known habitat near Campiglio. It agreed with *glacialis* in a habitat of about 8,000 feet. It differed from it, in any other places where I have taken *glacialis*, now a good many, in all the specimens being of fairly uniform type, viz. closely resembling *melas*; in other localities, darker or lighter forms, or others occur together in varying proportions. There is always some range of variation. M. Calberla, however, showed that the male appendages proved *nicholli* without a shadow of doubt to be *glacialis*. This is perhaps the most marked and celebrated case of a *melas* form presented by an *Erebica* that is often of fairly ordinary *Erebica* facies. But *pronoc*, *manto* and others have well-known dark forms.

When we come to the few wing-markings these species present, that have a real value for specific distinction, we find *lefebvrei* by itself and *nerine* and *melas* in agreement.

All have the pair of ocelli on the fore-wings between veins 4 and 6. All have in addition, but rarely, the apical spot between 6 and 7. When this occurs we find it in *lefebvrei* in a line with the other two, as in *evias*. But in *nerine* and *melas*, it is nearer the margin as in *stygne*, not quite so far out as in *stygne* but nearly so. When I wanted to examine as many specimens as possible, as to this and other characters, I looked over the series in the British Museum at South Kensington, and the first *lefebvrei* that caught my eye had this apical spot very far out; this did not accord with my other observations, but a second glance showed this specimen to be one of *stygne*, a species that often flies with *lefebvrei*. This specimen had, up till the date of my examination, escaped detection as an intruder. The circumstance illustrates how difficult it

sometimes is to separate some species of *Erebia* from each other. Some specimens of *stygne* that I took flying with *lefebvrei* required rather close scrutiny to detect; I was always able, however, to say which species a doubtful specimen belonged to, before examining the appendages, but it is extremely useful to have so certain a method to fall back upon for confirmation, the appendages of *lefebvrei* and *stygne* being so abundantly different.

The ocelli of the fore-wing present another very decisive character. They are much nearer the margin in *lefebvrei* than in the others. Comparing specimens much alike for size and other things, the 2nd ocellus is 2.5 mm. from the cilia in *lefebvrei*, 4.0 mm. in *melas*, and the upper of the two apical ocelli is in *melas*, as compared with *lefebvrei*, further from the margin to a greater proportional distance than the second. The difference in alignment when the third apical spot is present already referred to, might be perhaps more correctly described as due to a difference in position of the usual first spot rather than of the accessory one. (Pl. VIII.)

The fascia of the under-side, especially of the under-wing, presents features that are perhaps more to be depended on in distinguishing the species of *Erebia* from each other, than any other. (Pl. IX.)

The three forms we are considering, belonging as they do to the same group of *Erebiæ*, have a general similarity on the under-sides. The females, as usual, presenting the markings characteristic of the species much more evidently than the males. In *lefebvrei*, indeed, one might say the under-side of the hind-wing of the male is uniformly deep black (ocelli apart), but in a few specimens, that are very perfect indeed, a slightly different tone of the black, or one might almost say a mere difference in the polish of the surface, shows the markings in the characteristic line, that is quite plain in the females. In *melas* the males are very black beneath, but the black is not so deep and intense as in *lefebvrei*, and it has to be a decidedly bad specimen in which the characteristic marking is invisible. (Pl. X.)

In many *Erebiæ* there is, underneath the hind-wing, a pale transverse band in which the ocelli are placed; this band is well developed in *curyale* and *æthiops*. In our species it is also quite distinct.

The darker margin outside the band is difficult to see

in *lefebvrei* ♂, but in *melas* ♂ and *nerine* ♂ it is a more or less continuous narrow band, its basal margin either quite straight or more or less indented at the veins. In the ♀♀ of all it is more or less broken into lunules separated by the pale band stretching along the veins either almost or quite to the cilia.

The basal margin of the pale band is however by no means the same. It is so nearly the same in the two sexes that we may treat of them together. In *lefebvrei*, this margin begins on the costa at much the same place as in the others, and crosses the wing in the same curves as in *melas* and *nerine*, but much less pronounced, so that though one could not call it straight, it is almost so in comparison with their more marked curves and indentations. When it reaches the third (there are usually 3, there may be 2, 1 or none, I have no specimen with 4 on the under-side) ocellus between veins 2 and 3 it is very close to it, about the width of the (average) ocellus distant from it, and proceeds down and reaches the margin in the next interspace (between veins 1 and 2). In *nerine* and *melas* this line is more curved, in *nerine* almost always markedly so, in *melas* only a few specimens have it so curved as in *nerine*, but all much more so than in *lefebvrei*. By curved I mean especially the rounded projections between veins 3 and 4, and between 4 and 6, with the marked indentation on vein 4. When opposite the last ocellus (between veins 2 and 3) it is a long way from it, it proceeds very well-defined across the next interspace and reaches the hind margin to the inner-side of vein 1. This difference amounts practically to this transverse line at its inner extremity reaching the margin of the wing on the hind margin in *lefebvrei*, on the inner margin in *melas* and *nerine*.

It may be further noted that as in the front-wing, so in the hind one, the third ocellus especially is much nearer the hind margin in *lefebvrei* than in *melas* (or *nerine*), and is nearer also in comparison with the 2 (usually 2) others. I was, at one time, convinced that there was a difference in the form of the wings in the two species, *lefebvrei* and *melas*.

I have been quite unable, however, to substantiate this opinion by wing measurements. The strong impression one has, however, to this effect, is not hallucination, it is probably the result of the different positions of the ocelli

in the two species. If the ocelli occupy, always (say in the genus *Erebia*), precisely the same place, morphologically, on the wing, as seems very probably the case, then the apparently changed positions must be due to a variation in the relative proportions of the wing areas internal and external to the ocelli, a very important change of wing form, although the actual outline may be unaltered.

There is another difference between *lefebvrei* on the one hand and *melas* and *nerine* on the other, in the colouring of the antennæ. In some genera a difference in the colouring of the antennæ forms a very good specific character. In *Erebia* I think this is not so and has little more value than the colour of the wings. Still, such as it is, it is very decided in the present case. In *melas* a glance at a long series gives the impression that the under-side of the antenna is white, and similarly in the case of *lefebvrei*, that it is dark, whilst in *nerine* the same area looks pale, not so white as in *melas*, but the difference is more from contrast with the paler insect than in actual colour of the antennæ. In both the colour is creamy, tending to white in *melas*, to terra-cotta in *nerine*.

A closer examination shows the tinting to be much alike in *nerine* and *melas* and to consist of a broad stripe of nearly three-fourths the circumference of the shaft of the antenna, narrower on the club and almost reaching the tip, it is paler on the club. The breadth of the pale portion is such that it is almost always visible from above; in an ordinary set specimen it is obvious without moving the insect.

In *lefebvrei* the antennæ from above look uniformly black, the pale band is very narrow (or wanting in some) and of a darker colour, and is interrupted at the neck of the club, a feature that exists in some degree in *melas*. In short the pale side in *melas* obtrudes itself, in *lefebvrei* requires looking for, hence the conclusion derived from a first glance at a series.

These differences are found not only in selected examples, but in all specimens examined. I have examined probably nearly 200 specimens of each of the three forms, nearly half this number in my own boxes and Mr. Tutt's. They seem abundantly adequate to prove *lefebvrei* and *melas* to be distinct from each other, even if the evidence from the appendages did not exist. They also prove that *melas*

and *nerine* are races that are very closely related. My own opinion still is, that they are local forms of one species, but there is no difficulty in any one believing they are distinct; it is more a question of the definition of "race" and "species" than of the precise amount by which the two forms differ.

The plates are from enlarged photographs by Mr. A. E. Tonge, and will enable all the points noted to be easily seen, except the colour of the antennæ, which they do not illustrate.

*Lycæna pyrenaica* is a very interesting species, being very close to *L. orbitulus*, yet abundantly distinct. It is especially to be observed that it is not the Pyrenæan representative of *L. orbitulus*, that species occurring in the same region.

*Pyrenaica* seems to be less variable than *orbitulus*. I found odd specimens at various places near Gavarnie, places a very long way from and very different to that in which I appeared to recognise one of its headquarters. This was on a steep slope at about 5,500 feet, where a limestone of almost chalky whiteness formed the greater part of the surface, sometimes in rocky outcrops, sometimes in partially overgrown screes, not easy to get about on, sometimes quite impassable.

One recognised that the marked paleness of *pyrenaica* here corresponded with the colour of the rocks, and when the males settled, it was very difficult to see them on the white rubble, unless they had been actually seen to alight. One concluded that this cryptic coloration afforded them valuable protection, and that their rarity elsewhere was probably due to the want of this and not to any absence of food-plant or climatic conditions. I gather that M. Pierret (Ann. Soc. Ent. France, 1848, p. 399) found the insect at precisely the same place where I took it.

Any doubt as to *pyrenaica* being a variety of *orbitulus* is set at rest by the difference in the ancillary appendages. (Pl. XI.) The jointed apophyses of the dorsum have rather straighter tips, and the toothed extremities of the clasps, where the differences between different species of *Lycæna* are most easily observable, have 8 or 9 teeth in *orbitulus*, and 16 or 17 much smaller ones in *pyrenaica*. The smooth, chitinous plate which carries them is of about the same size and form in both species.



At first I thought there was some ground for regarding *orbitulus*, var. *oberthüri*, as also a distinct species, but a larger number of specimens showed this not to be so. The round head of the clasp in *orbitulus* (Pl. XII, Arolla specimen) and the more beak-shaped one of *oberthüri* (Lac de Gaube specimen, Pl. XIII) are the result probably of slightly different orientations of the specimens on the slides, as other specimens show beaked heads in Swiss specimens and round-headed ones for the Pyrenees.

It is also the case that in a considerable series I find little difference in the wing characters of the imagines, and examples from the Simplon are as large as the largest *oberthüri*. Simplon 35.0 mm. *Oberthüri* 34.0 mm.

M. Oberthür has said nearly all there is to say as to the distinctness of *pyrenaica* and *orbitulus*; it is but fair to say that M. Pierret, sixty years ago, was equally definite in correction of M. Boisduval, he said nothing about *E. lefebvrei* being a good species, because he saw no reason to suppose any one could entertain any other opinion; and such a question would probably never have arisen but for German objections to French forms being considered good species.

M. Pierret says *orbitulus* of the Pyrenees is quite like that of the Alps. M. Oberthür says they are larger and more robust. Looking at my series of both, I come to the apparently absurd conclusion that both are right. Except the Simplon specimens, M. Oberthür's dictum is correct. Including these, there is no *orbitulus* from the Pyrenees that cannot be very fairly matched by one from the Alps. Yet in the mass they look different, apart from size. Again excepting the Simplon specimens, the Alpine form has the base of the wings blue, the margins dark, and the one grades insensibly into the other. The Pyrenean specimens have the centre of the wings blue, with a broad dark margin tolerably well defined generally on the hind-wings, rarely marked on the fore-wings. This refers to the mass of specimens but each group has individuals more or less of the other type. They are then somewhat distinct races, but neither has any specimens that cannot be very nearly matched from the other race. The Simplon race are, however, var. *oberthüri* quite as much as those from the Pyrenees. It is also the case that the Alpine specimens, besides being smaller than *oberthüri*, have some very small specimens, one as small as 22.0 mm.

The smallest *oberthürri*, a ♀, being 30·0 mm. The smallest specimens are from Dauphiné and the Engadine. The legends under the Plates, with the above descriptions, sufficiently describe them.

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EXPLANATION OF PLATES VIII—XIII.

[See Explanation facing the PLATES.]